Two Country Model of Macroeconomic Linkages to Agricultural Commodity Flows: The U.S.-Japan Case

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Abstract

This paper investigates the effect of Japanese and U.S. monetary policies on the U.S. and Japanese economies. As long as monetary independence does not exist in the flexible exchange rates, the U.S. farm sector would be hurt by the expansion of Japanese money supply through the exchange rate channel.

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I. Introduction

The movement away from the fixed exchange rate scheme made U.S. agriculture more vulnerable to international economic events and policies. Analysis of agricultural market dynamics must take into account not only demand and supply forces and the effects of governmental intervention but also the U.S. and foreign monetary policies. The purpose of this paper is to present the result of a two-country model for empirically estimating the effects of Japanese monetary policy on the U.S. economy. Japan was taken as the other country because she has a large, long-standing and growing trade relationship with the U.S. The model includes goods market, money market and foreign exchange market for each country for an integrated framework where the interrelationship among agriculture, the domestic economy and the international economy was established. Section II presents the estimated model. The simulation of and experiments with the model are reported in Section III followed by a summary in Section IV.

II. Estimated Model

The model consists of 28 behavioral equations and 10 identities. The parameters of the simultaneous equations model are estimated by two-stage least squares(2SLS) for the 1965 to 1985 period. For each equation, the estimated coefficients, standard errors (parentheses), and the definitions of the variables are reported in Table 1. The model includes goods market, money market, and foreign exchange market. The goods market is divided into agricultural goods, industrial(traded) goods, and service(nontraded) goods. For the U.S. agricultural sector, we further divide it into (1)grain and oilseed crop sector where it is a net export product, and (2)livestock, vegetable and fruit sector where it is a net import product. Each sector includes equations of domestic demand, domestic supply, excess supply or demand, and market clearing condition for both countries. It is specified as a series of supply and demand equations with price playing the equilibrating role. Since the estimation period includes the fixed and flexible exchange rate period, the exchange rate is treated as exogenous in the first period and as endogenous variable in the second period. To be consistent with exchange rate

specification and the 2SLS method used in this study, we use the instrumental variable (IV) method to estimate excess supply/demand equations where the exchange rate is an explanatory variable. The flexibility to choose instrumental variables enables us to include exchange rate as exogenous in the fixed rate period and as endogenous in the flexible rate period.

The money market includes the equations of national income, consumer price index, national expenditure, interest rate, and Phillips curve for each country. We follow Shei (1978) to link the money and goods markets by national expenditure which replaces the national disposal income in domestic demand(absorption) equations. Since the model is specified under both fixed and flexible exchange rate systems, the dichotomy between flexible-exchange rate model with exogenous money supply and mobile-money model with exogenous exchange rate is used in our model.

The foreign exchange market includes the determination of Yen/Dollar rate and the exchange rate linkage. The monetary approach was used to specify the Yen/$ rate as a function of relative money supply, relative income level, and interest rate difference between two countries. In order to link the fixed and flexible rate regimes in estimating the exchange rate, the restricted-coefficient regression method is used. To illustrate the use of restricted-coefficient method, we first define D1=1 and D2=0 for the 1965-1971 period, and D1=0 and D2=1 for the 1972-1985 period. Exchange rate determination is as,

(2.1) $e = D_1 * \beta_0^1 + D_2 * [\beta_0^2 + \beta_1^2 (m/m^*) + \beta_2^2 (y/y^*) + \beta_3^2 (r-r^*)]$.

Equation (2.1) then is the restricted-coefficient model we use to estimate the exchange rate determination. Our empirical result indicates that F=0.09 which can not reject the restricted model estimation at 0.01 confidence level.

III. Validation and Simulation Experiments

The estimated behavioral equations and identity equations are used to test the overall ability of the model to replicate the observed values of the endogenous variables. The model is tested for the 1979 to 1985 period by setting all the exogenous variables at their observed levels and substituting the estimated coefficients into the behavioral equations to solve the model. The model is linear in the estimation of coefficients, but is nonlinear in the mathematical simulation. The nonlinear Newton simulation method on SAS was used for the validation and all the experiment simulations.

One criterion to evaluate a simulation model is the fit of the endogenous variables in a simulation context. The measures that is often used is Theil inequality coefficient (U) which will always fall between 0 and 1. If $U=0$, $Y_t^s = Y_t^a$ for all t and there is a perfect fit. If $U=1$, on the other side, the predictive performance of the model is as bad as it possibly could be.

In the simulation result, we found that U.S. nominal interest rate was negative for the 1983 to 1985 period and had the highest Theil inequality coefficient at the value of 0.81. For all other variables, the U is less than 0.20, which would imply that the simulated values trace the actual values fairly closely.

The simulation experiments include to investigate the impact of U.S. and Japanese monetary policies on the U.S. and Japanese agricultural economies. The comparison of the dynamic simulation results with and without the policy shows the impact of such policy.

Beginning October 6, 1979, the Federal Reserve changed its monetary policy operation procedure from targeting the federal funds rate to a "reserve targeting" whereby it attempts to hit a target level of bank reserves estimated to be consistent with desired level of the money stock. Thus we analyze the effects of the changes in the money supply growth rate for the 1979 to 1985 period.

Analysis of U.S. Money Supply Increase

In this simulation, we tried to investigate the effect of a sustained increase in U.S. money supply by 3 percent. The first round effect is reported in Figure 1.

In the first round effect of the increase in nominal money supply, the value of the dollar (ER_{jpus} or ER_{usrow}) first depreciated by 1.72 percent. The depreciated dollar causes the export of grains and oilseeds to increase by 2.42 percent and the import of livestock, vegetables and fruits decrease by 6.15 percent. The nominal interest rate decreased by 4.38 percent. Together the increase in money supply and the decrease in interest rate made the expenditure level increase by 0.52 percent. The higher expenditure encouraged the consumption of the grains and oilseeds by 0.19 percent, the consumption of livestock, vegetables and fruits by 0.33 percent, the consumption of industrial product by 0.64 percent and the consumption of service product by 0.39 percent.

At this stage, we have all the expected effects corresponding to money supply increase. The problem is when agricultural prices are implicitly determined by the demand and supply equilibrium condition, they would collect all the residuals from the demand and supply simulations. Thus, we found that the price of grains and

oilseeds increased by 231.4 percent when there is only 3 percent increase in money supply. The overshooting in agricultural prices is so large that the consumer price index then increased by 4.00 percent which is larger than 3 percent increase in money supply. This much higher increase in consumer price index reversed all the first round effects.

The reason why agricultural prices overshoot too much is because they are specified to collect all the residuals from the domestic demand, domestic supply, and the trade equations in the Newton simulation solution. During the 1983 to 1985 period, U.S. grains and oilseed sector was not well behaved since we had drought in 1983. We tried to change the agricultural domestic demand equations to the inverse demand equations. However, we could not find the solution under this specification of prices. The following section will only focus on the effects of Japanese monetary policy on the U.S. economy for the first round effect.

Analysis of Japanese Money Supply Increase

Table 2 reports the simulation results for major endogenous variables under this policy experiment. As expected, Japanese money supply expansion depreciates the value of the yen and appreciates the value of the U.S. dollar. The yen/$ rate on average increases by 2.25 percent each year. This causes the import of agriculture to decrease in 1979 and 1980. However, the degree of change is small, and it was increased for the 1981 to 1985 period. When the yen is devalued, it also puts upward pressure on all the prices and the consumer price index. The percentage increase in the domestic price of agriculture is larger than the increase in the consumer price index, which supports overshooting in Japan. Thus, the increase in the money supply has the real effect on the agriculture sector. Since Japanese agriculture supply is specified as a perfectly inelastic curve, it is not changed by the price changes. Although, the higher real price of agricultural output decreases the consumption, it is more than offset by the stimulation of the increase in the real expenditure level.

The increase in the Japanese money supply also has a positive effect on the nominal national income. The nominal national income was increased by 9.42 percent in 1979; after that, it was increased by about 3 percent as was the rate increase in money supply. However, we found that Japanese nominal interest rate is increased but real interest rate is reduced by the Japanese monetary expansion.

When there is an increase in Japanese money supply, the U.S. domestic economy and agricultural economy will be affected through the exchange rate channel. Niehans (1984) referred to this as "imported

overshooting" which implies that, in the short run, the floating exchange rate will not insulate an economy against the other country's monetary policy.

As we mentioned, we are only able to analyze the first round effect on the U.S. economy. The average 2.21 percent appreciation of the value of dollar (ER_{usrow}) which was caused by Japanese money supply expansion decreased U.S. grains and oilseeds exports by 3.12 percent and increased both livestock, vegetables and fruits imports and industrial imports by 7.91 percent and 5.64 percent. It also depressed the price index of grains and oilseeds and price index of livestock, vegetables and oilseeds by 294.55 percent and 38.21 percent, respectively. The consumer price index then was decreased by 4.42 percent. Since the changes in the agricultural prices are larger than the consumer price index, there is a real effect on the agriculture sector. The lower domestic real prices of agriculture cause the output of grains and oilseeds and the output of livestock, vegetables and fruits to decrease by 4.82 percent and 1.51 percent, respectively. This implies that the U.S. farm sector would be hurt by the Japanese monetary expansion.

IV. Summary

In the long run, each country's monetary policy affects only its own price level. In the short run, however, monetary independence, which is the case for the fixed exchange rate system, will not hold for flexible exchange rates. If there is an increase(decrease) in money supply abroad, the primary effect is an immediate appreciation(depreciation) of the value of the dollar which is called imported overshooting. By the effect of imported overshooting, the foreign monetary policy produces a wave of disturbances in the domestic economy.

The purpose of this study was to develop a two-country model for empirically estimating the effects of U.S. and Japanese monetary policies on the U.S. and Japanese domestic and agricultural economies. The evidence shows that we can not ignore the effects of Japanese monetary policies on the U.S. domestic economy and agricultural economy through the exchange rate channel. Therefore, foreign monetary policies need to be considered in the evaluation of U.S. domestic economic and agricultural economic policies.

Table 1. Estimated Model

Goods Market

Domestic Demand

$$(1)\quad \frac{DDG_{us}}{PG_{us}} = 16.2 - 0.006\ \frac{PG_{us}}{CPI_{us}} + \underset{(1.94)}{0.751}\ \left(\frac{AE_{us}}{CPI_{us}}\right)/POP_{us}$$
(0.03)

$$(2)\quad \frac{DDL_{us}}{PL_{us}} = 28.2 - 0.070\ \frac{PL_{us}}{CPI_{us}} + \underset{(0.57)}{4.579}\ \left(\frac{AE_{us}}{CPI_{us}}\right)/POP_{us}$$
(0.04)

$$(3)\quad \frac{DDA_{jp}}{PA_{jp}} = 18569 - \underset{(26.56)}{101.80}\ \frac{PA_{jp}}{CPI_{jp}} + \underset{(2.29)}{9.66}\ \left(\frac{AE_{jp}}{CPI_{jp}}\right)/POP_{jp}$$

$$(4)\quad \frac{DDI_{us}}{PI_{us}} = 319.5 - \underset{(1.14)}{7.384}\ \frac{PI_{us}}{CPI_{us}} + \underset{(1.28)}{126.6}\ \frac{PS_{us}}{CPI_{us}} + \underset{(9.11)}{134.12}\ \left(\frac{AE_{us}}{CPI_{us}}\right)/POP_{us}$$

$$(5)\quad \frac{DDI_{jp}}{PI_{jp}} = -8364.0 + \underset{(2.72)}{46.949}\ \left(\frac{AE_{jp}}{CPI_{jp}}\right)/POP_{jp}$$

$$(6)\quad \frac{DDS_{us}}{PS_{us}} = -371.6 + \underset{(9.14)}{149.03}\ \left(\frac{AE_{us}}{CPI_{us}}\right)/POP_{us}$$

$$(7)\quad \frac{DDS_{jp}}{PS_{jp}} = -18907 + \underset{(6.67)}{92.58}\ \left(\frac{AE_{jp}}{CPI_{jp}}\right)/POP_{jp}$$

Domestic Supply

$$(8)\quad \frac{DSG_{us}}{PG_{us}} = -11.0 + \underset{(0.13)}{1.121}\left(DSG_{us}\right)_{-1} + 0.072\ \frac{PG_{us}}{CPI_{us}} + \underset{(2.49)}{11.0}\ D3$$

$$(9)\quad \frac{DSL_{us}}{PL_{us}} = -8.7 + \underset{(0.14)}{0.854}\left(DSL_{us}\right)_{-1} + 0.175\ \frac{PL_{us}}{CPI_{us}}$$

$$(10)\quad \frac{DSA_{jp}}{PA_{jp}} = 7991 + \underset{(0.25)}{0.364}\left(DSA_{jp}\right)_{-1}$$

$$(11)\quad PI_{us}-(PI_{us})_{-1} = -0.38 + \underset{(4.64)}{26.745}(W_{us}-(W_{us})_{-1}) - \underset{(0.29)}{0.935}(Q_{us}-(Q_{us})_{-1})$$

$$(12)\quad PI_{jp}-(PI_{jp})_{-1} = -5.20 + \underset{(0.39)}{1.96}\ (W_{jp}-(W_{jp})_{-1})$$

$$(13)\quad PS_{us}-(PS_{us})_{-1} = -2.868 + \underset{(3.82)}{33.840}\ (W_{us}-(W_{us})_{-1})$$

$$(14)\quad PS_{jp}-(PS_{jp})_{-1} = 0.417 + \underset{(0.22)}{1.132}\ (W_{jp}-(W_{jp})_{-1})$$

Excess Supply or Excess Demand

$$(15)\ \frac{XDG_{us}}{PGus} = -17.1 - \underset{(0.03)}{0.092}\ \frac{PG_{us}}{CPI_{us}} + \underset{(7.71)}{22.66}\left(ER_{usrow} * \frac{GP_w}{CPI_{us}}\right) + \underset{(0.05)}{0.22}\ GDP_w$$

$$(16)\ \frac{MDL_{us}}{PLus} = -0.2 + \underset{(0.01)}{0.031}\ \frac{PL_{us}}{CPI_{us}} - \underset{(1.22)}{4.77}\left(ER_{usrow} * \frac{GP_w}{CPI_{us}}\right) + \underset{(0.01)}{0.04}\ GDP_w$$

$$(17)\ \frac{MDA_{jp}}{PA_{jp}} = -768 - \underset{(1.86)}{1.42}\ \left(ER_{jpus} * \frac{GP_w}{CPI_{jp}}\right) + \underset{(9.93)}{39.32}\ GDP_w$$

$$(18)\ \frac{MDI_{us}}{PI_{us}} = -79.3 - \underset{(18.27)}{52.85}\ \left(ER_{usrow} * \frac{GP_w}{CPI_{us}}\right) + \underset{(0.14)}{1.66}\ GDP_w$$

$$(19)\ \frac{XDI_{jp}}{PI_{jp}} = 6767 - \underset{(83.91)}{203.68}\ \frac{PI_{jp}}{CPI_{jp}} + \underset{(9.59)}{35.52}\left(ER_{jpus} * \frac{CPI_{us}}{CPI_{jp}}\right) + \underset{(77.14)}{75.57}\ GDP_w$$

Goods Market Clearing Conditions

$$(20)\ \frac{DSG_{us}}{PG_{us}} = \frac{DDG_{us}}{PG_{us}} + \frac{XDG_{us}}{PG_{us}} \qquad (21)\ \frac{DDL_{us}}{PL_{us}} = \frac{DSL_{us}}{PL_{us}} + \frac{MDL_{us}}{PL_{us}}$$

$$(22)\ \frac{DDI_{us}}{PI_{us}} = \frac{DSI_{us}}{PI_{us}} + \frac{MDI_{us}}{PI_{us}} \qquad (23)\ \frac{DSG_{us}}{PS_{us}} = \frac{DDG_{us}}{PS_{us}} + \frac{XDG_{us}}{PS_{us}}$$

$$(24)\ \frac{DDA_{jp}}{PA_{jp}} = \frac{DSA_{jp}}{PA_{jp}} + \frac{MDA_{jp}}{PA_{jp}} \qquad (25)\ \frac{DSI_{jp}}{PI_{jp}} = \frac{DDI_{jp}}{PI_{jp}} + \frac{XDI_{jp}}{PI_{jp}}$$

$$(26)\ \frac{DDS_{jp}}{PS_{jp}} = \frac{DSS_{jp}}{PS_{jp}}$$

Money Market

Real Expenditure Levle

$$(27)\ \frac{AE_{us}}{CPI_{us}} = -149 + \underset{(0.10)}{0.82}\ \frac{Y_{us}}{CPI_{us}} + \underset{(0.14)}{0.40}\ \frac{M2_{us}}{CPI_{us}} + \underset{(2.00)}{5.88} r_{us} - \underset{(1.77)}{1.54}\left(CPI_{us} - (CPI_{us})_{-1}\right)$$

$$(28)\ \frac{AE_{jp}}{CPI_{jp}} = 6537 + \underset{(0.01)}{0.279}\ \frac{M2_{jp}}{CPI_{jp}} + \underset{(447.54)}{477.08} r_{jp} + \underset{(286.76)}{984.31}\left(CPI_{jp} - (CPI_{jp})_{-1}\right)$$

Nominal Interest Rate

$$(29)\ r_{us} = 1.06 + \underset{(0.12)}{0.35}(r_{us})_{-1} + \underset{(0.01)}{0.018}\frac{Y_{us}}{CPI_{us}} - \underset{(0.01)}{0.025}\frac{M2_{us}}{CPI_{us}} + \underset{(0.17)}{0.085}\left(CPI_{us} - (CPI_{us})_{-1}\right) + 2.7D4$$

$$(30)\ r_{jp} = 5.5 + \underset{(0.20)}{0.112}(r_{jp})_{-1} - \underset{(0.000007)}{0.000008}\ \frac{M2_{jp}}{CPI_{jp}} + \underset{(0.12)}{0.451}\left(CPI_{jp} - (CPI_{jp})_{-1}\right)$$

Consumer Price Index

$$(31)\ CPI_{us} - (CPI_{us})_{-1} = 0.22 + \underset{(0.007)}{0.015}(PG_{us} - (PG_{us})_{-1}) + \underset{(0.04)}{0.288}(PI_{us} - (PI_{us})_{-1}) + \underset{(0.03)}{0.594}\ (PS_{us} - (PS_{us})_{-1})$$

$$(32)\ CPI_{jp}-(CPI_{jp})_{-1} = 0.39 + \underset{(0.02)}{0.027}\ (PA_{jp}-(PA_{jp})_{-1}) + \underset{(0.04)}{0.246}\ (PI_{jp}-(PI_{jp})_{-1}) + \underset{(0.07)}{0.661}\ (PS_{jp}-(PS_{jp})_{-1})$$

Nominal National Income

$$(33)\quad Y_{us} = DSG_{us} + DSL_{us} + DSI_{us} + DSS_{us}$$

$$(34)\quad Y_{jp} = DSA_{jp} + DSI_{jp} + DSS_{jp}$$

Wage Rate Equations

$$(35)\ W_{us} = 4.62 + \underset{(0.0004)}{0.0006}\ \frac{M2_{us}}{CPI_{us}} - \underset{(0.03)}{0.046}U_{us}$$

$$(36)\ W_{jp}-(W_{jp})_{-1} = 4.4 + \underset{(0.0001)}{0.0004}\ (M2_{jp}-(M2_{jp})_{-1}) - \underset{(1.44)}{2.84}\ U_{jp}$$

Foreign Exchange Market

Exchange Rate Determination

$$(37)\ ER_{jpus}\left(\frac{CPI_{us}}{CPI_{jp}}\right) = 349.95\ D_1 + 128.94\ D_2 + \underset{(1.84)}{2.363}\left\{D_2*\left[\left(\frac{M2_{jp}}{CPI_{jp}}\right)/\left(\frac{M2_{us}}{CPI_{us}}\right)\right]\right\}$$

$$- \underset{(10.58)}{5.455}\left\{D_2*\left[\left(\frac{Y_{jp}}{CPI_{jp}}\right)/\left(\frac{Y_{us}}{CPI_{us}}\right)\right]\right\} + \underset{(6.21)}{13.653}\left\{D_2*\left[\left(\frac{r_{jp}}{CPI_{jp}}\right)-\left(\frac{r_{us}}{CPI_{us}}\right)\right]\right\}$$

Exchange Rate Linkage

$$(38)\quad ER_{usrow} = ER_{jprow} \,/\, ER_{jpus}$$

Definitions of the Variables:

Endogenous Variables

DDG=value of domestic absorption for grains and oilseeds,

DDL=value of domestic absorption for livestock, vegetables and fruits

DDA=value of domestic absorption for agriculture,

DDI=value of domestic absorption for industrial goods,

DDS=value of domestic sbsorption for services,

DSG=value of domestic output of grains and oilseeds,

DSL=value of domestic output of livestock, vegetables and fruits,

DSI=value of domestic output of industrial goods,

DSS=value of domestic output of services,

XDG=value of net exports of grains and oilseeds,

MDL=value of net imports of livestock, vegetables and fruits,

MDI=value of net imports of industrial goods,

MDA=value of net imports of agricultural goods,

XDI=value of net exports of industrial goods,

PG=Divisia price index of grains and oilseeds,

PL=Divisia price index of livestock, vegetables and fruits,

PA=Divisia price index of agricultural goods,

PI=wholesale price index of industrial goods,

PS=consumer price index of services,

CPI=consumer price index or domestic general price index,

Y=nominal national income,

AE=nominal national expenditure,

r=nominal rate of interest,

W=wage rate index,

ER_{jpus}=the exchange value of Japanese yen in terms of U.S. dollar, Yen/$,

ER_{usrow}=the exchange value of U.S. dollar in terms of foreign currencies, $/SDR.

Exogenous Variables

ER_{jprow}=Japanese Yen/SDR,

GDP_w=major industrial countries' GDP, at constant price,

GP_w=major industrial countries' GDP deflator,

M2=nominal money supply,

POP=population,

Q=productivity index in the industrail sector,

U=unemployment rate.

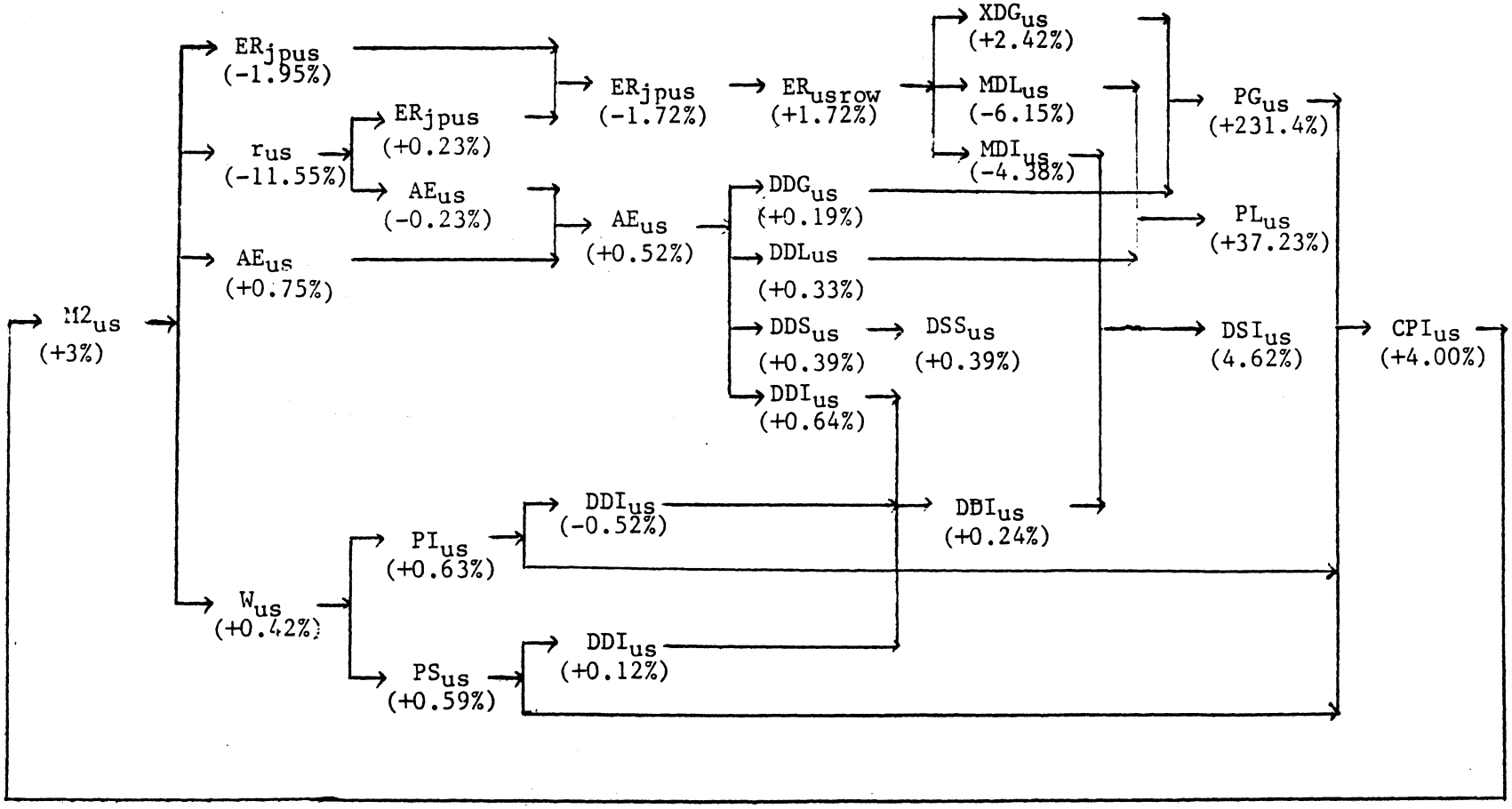

Figure 1. First round effect of 3 percent increase in U.S. money supply on U.S. economy

Table 2. Dynamic simulation of a sustained increase in the Japanese money supply growth rate by 3 percent, 1979-1985.

	Year	1979	1980	1981	1982	1983	1984	1985	AVERAGE
Japan									
AE_{jp}/CPI_{jp}	base	64292	65217	69930	69638	70847	73438	79635	70428
	control	67779	65665	70480	70087	71235	73785	80042	71296
	% change	5.42	0.69	0.79	0.64	0.55	0.47	0.51	1.30
CPI_{jp}	base	108.86	112.77	118.91	122.99	126.20	129.64	136.57	122.28
	control	111.56	115.58	121.99	126.30	129.73	133.41	140.69	125.61
	% change	2.48	2.49	2.59	2.69	2.80	2.91	3.01	2.71
DDA_{jp}/PA_{jp}	base	14943.7	15396.1	15630.5	15691.1	15840.3	15979.3	16063.7	15649.2
	control	14943.4	15395.8	15632.6	15692.3	15943.2	15983.6	16068.5	15665.6
	% change	0.00	0.00	0.01	0.01	0.65	0.03	0.03	0.10
DDI_{jp}/PI_{jp}	base	17686.1	17855.2	19541.9	19238.0	19526.4	20363.0	22599.1	19544.2
	control	19099.3	18035.4	19761.4	19415.8	19678.9	20499.1	22757.2	19892.4
	% change	7.99	1.01	1.12	0.92	0.78	0.67	0.70	1.89
DSI_{jp}/PI_{jp}	base	23936.9	25171.4	26617.7	27630.1	28211.6	31570.1	35637.1	28396.4
	control	25078.7	25046.9	26460.5	27431.4	27923.9	31209.1	35272.7	28346.2
	% change	4.77	-0.49	-0.59	-0.72	-1.02	-1.14	-1.02	-0.03
DSS_{jp}/PS_{jp}	base	32462.0	32796.0	36122.0	35523.0	36091.0	37741.0	42151.0	36126.6
	control	35249.0	33151.0	36555.0	35873.0	36392.0	38009.0	42462.0	36813.0
	% change	8.59	1.08	1.20	0.99	0.83	0.71	0.74	2.02
ER_{jpus}	base	248.20	257.70	255.30	255.90	275.00	351.70	416.30	294.30
	control	254.10	263.90	260.50	262.00	281.00	359.20	425.60	300.90
	% change	2.38	2.41	2.04	2.38	2.18	2.13	2.23	2.25

Table 2 (continued).

	Year	1979	1980	1981	1982	1983	1984	1985	AVERAGE
MDA_{jp}/PA_{jp}	base	3041.0	3069.2	3149.1	3153.3	3282.1	3413.6	3495.3	3229.08
	control	3040.6	3068.9	3151.2	3154.6	3284.9	3417.8	3500.1	3231.17
	% change	-0.01	-0.01	0.07	0.04	0.09	0.12	0.14	0.06
PA_{jp}	base	96.08	94.91	101.39	103.39	104.97	108.25	119.08	104.01
	control	101.66	97.70	104.54	112.60	108.27	111.71	123.05	108.50
	% change	5.80	2.93	3.10	8.91	3.15	3.20	3.34	4.35
PI_{jp}	base	101.50	103.56	108.82	111.01	111.82	112.92	119.27	109.84
	control	105.55	107.90	113.58	116.13	117.30	118.78	125.65	114.98
	% change	3.99	4.19	4.38	4.62	4.90	5.18	5.34	4.66
PS_{jp}	base	111.22	115.83	122.30	126.98	130.87	134.93	142.03	126.31
	control	113.56	118.34	125.05	129.95	134.04	138.32	145.72	129.28
	% change	2.11	2.17	2.25	2.34	2.42	2.51	2.60	2.34
r_{jp}	base	6.64	6.51	7.44	6.55	5.99	5.96	7.48	6.65
	control	7.85	6.68	7.57	6.66	6.10	6.08	7.64	6.94
	% change	18.23	2.71	1.84	1.74	1.85	2.02	2.24	4.38
r_{jp}/CPI_{jp}	base	6.10	5.77	6.25	5.32	4.74	4.60	5.47	5.46
	control	7.03	5.78	6.21	5.27	4.70	4.56	5.43	5.57
	% change	15.37	0.22	-0.73	-0.93	-0.92	-0.87	-0.75	1.63
XDI_{jp}/PI_{jp}	base	6250.8	7316.8	7075.8	8392.1	8685.1	11207.2	13038.0	8852.26
	control	5979.4	7012.0	6699.1	8015.6	8245.0	10710.0	12515.5	8453.80
	% change	-4.34	-4.17	-5.32	-4.49	-5.07	-4.44	-4.01	-4.55
Y_{jp}	base	71837	75752	85797	88741	91962	100178	117338	90229
	control	78601	78299	88815	91839	95132	103682	121660	94004
	% change	9.42	3.36	3.52	3.49	3.45	3.50	3.68	4.34

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